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Non Invasive Imaging

COMBINED ATRIOVENTRICULAR LONGITUDINAL STRAIN RATE DURING ISOVOLUMIC CONTRACTION PREDICTS PULMONARY CAPILLARY WEDGE PRESSURE IN PATIENTS WITH SYSTOLIC DYSFUNCTION

Poster Contributions
Hall C
Sunday, March 30, 2014, 3:45 p.m.-4:30 p.m.

Session Title: Non Invasive Imaging: Myocardial Strain, Cardiac Mechanics and Diastolic Function
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Authors: *Alaa M. Omar, Mohamed A. Abdel-Rahman, Mostafa Helmy, Hazem Khorshid, Hala Raslan, Osama Rifaie, National Research Centre, Medical Division, Department of Internal Medicine, Cairo, Egypt, Ain Shams University Hospital, Department of Cardiology, Cairo, Egypt*

Background: We recently reported that tissue Doppler (TD) mitral annular isovolumic contraction (IC) velocity (IVV) predicts pulmonary capillary wedge pressure (PCWP) in systolic dysfunction. Aim: Study the ability of TD-derived longitudinal left atrial (LA) and left ventricular (LV) strain rate (SR) during IC in predicting PCWP.

Methods: Thirty-five patients with heart failure symptoms were studied (age: 56±8 years, 12 (35%) females, and EF: 51±14%). PCWP was invasively measured immediately after echocardiographic measurement of IVV and peak longitudinal systolic LV and LA SR during IC and ejection (EJ). LV-SR were calculated from basal and mid segments of LV walls in apical views, while mean LA-SR during IC and EJ, and IVV were calculated from 4 LA walls, and their corresponding mitral annular positions. Atrioventricular SR (AV-SR) during IC and EJ was calculated as the sum of LV and LA values. Patients were then classified into 17 (%49) with EF≥55%, and 18 (51%) with EF<55% (62.7±4.4 vs. 40.2±10, p<0.001).

Results: . Age, Sex, risk factors, and medications were similar between both groups. In EF<55%, LV-SRI during EJ, LA-SRI during IC and EJ, and IVV were lower (1±0.3 vs. 1.2±0.2, 1.3±0.6 vs. 1.9±1, 1.5± 0.5 vs. 2.6±1.3 s-1, 4.63±1.2 vs.7.01±1.9 cm/s, p=0.03, 0.03, 0.001, <0.001). AV-SRI during IC and EJ were also lower in patients with EF<55% (2±0.8 vs. 2.7±1.06 s-1, 2.5±0.6 vs. 3.9±1.1 s-1, p=0.023, <0.001). LV-SRI during IC and EJ, LA-SRI during IC, AV-SRI during IC, and IVV correlated with PCWP in EF<55% (r=-0.59, -0.55, -0.68, -0.72, -0.63, p=0.01, 0.02, 0.002, <0.001, 0.005). Other correlates with PCWP in EF<55% were E/e' and left atrial volume (r= 0.47, 0.7, p=0.04, 0.001; respectively). Multivariate regression in EF<55% revealed that AV-SRI-IC was the only independent predictor of PCWP. Finally, IVV correlated with LV and LA SRI-IC and this correlation became strongest with AV-SRI during IC (r= 0.65, 0.71, 0.77, p=0.01, 0.002, 0.001; respectively).

Conclusion: in our study we showed that LA and LV SRI-IC act mutually to correlate with PCWP in patients with systolic dysfunction. The correlation between mitral annular IVV and PCWP in those patients might be a product of this combination.